

ENVIRONMENTAL IMPACTS OF SHALE GAS DEVELOPMENT

CALGARY, April 18-19, 2013

The University Consortium is organizing and sponsoring a Special Focus Meeting on the environmental aspects of shale gas development (SGD) with emphasis on actual and potential subsurface impacts. This meeting, which is by invitation only with a limit of 75 attendees, will be held on the University of Calgary campus, Calgary, Alberta, April 18-19, 2013 with facilitation by the University of Calgary. Rooms at Hotel Alma are being reserved for all.

Meeting Purpose and Scope

SGD by hydraulic fracturing has become over a short period a major source of natural gas in North America; however there has not been a corresponding effort directed at identifying and assessing all of the potential environmental impacts and therefore there is much controversy and debate within the present framework of limited monitoring and research. The purpose of this meeting is to clarify what is known and not known about several of the potential subsurface pathways concerning the environmental impacts of SGD. The pathways and related aspects will be examined and debated with emphasis on what is known, what is uncertain and what is not known within the framework of scientific hypotheses, evidence and process-related understanding. There will be emphasis on identification of knowledge gaps. This meeting will consider various topics including: gas leakage due to inadequate cement seals of wells, known and potential impacts of gas leakage on groundwater quality, subsurface system characterization and monitoring, both performance monitoring and long term impacts monitoring, seismicity and earthquakes, deep well injection of flow back liquids, recent advances in hydraulic fracturing technologies to minimize environmental impacts and models for funding of research to address knowledge gaps.

Background

The University Consortium for Field-Focused Groundwater Contamination Research was established in 1988 as a framework for academic research involving Canadian and American universities with funding from industry and government directed at groundwater problems of interest to industry and society at large. The Consortium has eight universities as primary members, four in Canada and four in USA and twelve corporate sponsors. One of the functions of this Consortium is to organize and sponsor a two day annual meeting attended by 40-70 people. These Consortium meetings are known as 'Focus Meetings', which are directed at a topic of mutual interest to industry and academia. The purpose of these Focus Meetings is to bring together invited representatives from academia, industry, the consulting community and government to examine and debate the selected topic. These meetings are normally held in Denver in October, however, this upcoming meeting concerning shale gas will be held in Calgary as a special meeting of the Consortium. This special meeting is being arranged because of the particular urgency associated with environmental issues related to shale gas development in Canada and the USA.

Format:

The number of attendees will be limited to 70 and by invitation only. In the spirit of encouraging open discussion, debate and deep probing into the scientific and technical issues, there will be no formal note taking, no report produced from the meeting and all PowerPoint presentations will be considered the sole

property of the presenters and will not be kept as a record of the meeting without written permission of the presenters. Each presented is asked to provide an Abstract but this is not mandatory and all attendees are asked to provide a short bio sketch (100 words).

Program Committee :

John Cherry, Director, University Consortium; Beth Parker, G360, University of Guelph; Maurice Dusseault, University of Waterloo, Cathy Ryan, University of Calgary and program communications manager, Dick Jackson, Geofirma Engineering [phone 519.699.4657; email: rjackson@geofirma.com].

The Program : Day 1

Registration: 7:30 – 8:30

Session 1: The Issues (Chair, John Cherry), 8:30 – 9:50

- An Overview of the Issues [John Cherry, University Consortium]
- The Origin of Natural gas and its Geology [Sally Sutton, CSU Fort Collins]
- Shale Gas Production and Hydraulic Fracture Stimulation [Craig Cipolla, Hess Energy]
- Discussion

Coffee break: 9:50 – 10:10

Session 2: Seismicity, Well Integrity, Gas Leakage & Contamination (Chair, Dick Jackson), 10:10 – Noon

- Induced Seismicity & Pore-pressure transmission [Emily Brodsky, UC Santa Cruz]
- The long-term well integrity issue [Maurice Dusseault, uWaterloo]
- Use of stable isotopes to fingerprint gas releases from leaky wells [Karlis Muehlenbachs, uAlberta]
- Understanding gas contamination of a buried valley aquifer [Dale Van Stempvoort, Environment Canada]
- Discussion

Lunch: Noon – 13:00

Session 3: Groundwater and Gas Monitoring (Chair, Maurice Dusseault) 13:00 – 14:20

- Groundwater Characterization and Monitoring Concepts Concerning Potential Shale Gas Impacts [Beth Parker, uGuelph]
- Groundwater Contamination by Stray Gas [Tony Gorody, Universal Geoscience, Houston]
- Developing a groundwater quality monitoring program for shale gas development areas [Bernhard Mayer, uCalgary]
- Discussion

Coffee Break, 14:20 – 14:40

Session 4: Canadian Experiences (Chair, Steve Moran) 14:40 – 16:00

- Well Completions, Cementing and Groundwater Monitoring in the Groundbirch Project, B.C. [Christa Seaman, Nigel Campbell and Jeremy Moore, Shell Canada]
- Québec's investigations into fracking safety, well integrity and current field work [René Lefebvre, INRS, uQuébec with Christine Rivard, GSC]
- Discussion

Session 5: Regulatory Perspective and Social License (Chair, Cathy Ryan) 16:00 – 17:00

- ERCB's regulatory program: Public Concerns and Science Reality around Shale Gas Development in Alberta [Kevin Parks, ERCB]
- The idea of a social license for shale-gas extraction [Jason Switzer, Pembina Institute]
- Discussion

Cash Bar, 17:00 – 18:00

Group Dinner, 18:00 – 20:00

The Program: Day 2

Session 6: Borehole Measurements and Mathematical Models (Chair, Bernhard Mayer) 08:00 – 09:40

- Testing zonal isolation with cement logging tools [Don Reinheimer, SLB]
- Total dissolved gas pressure as a master variable for gas-rich groundwater quality [Cathy Ryan, uCalgary]
- Microseismic monitoring [Dave Eaton*, uCalgary with Mirko van der Baan*, uAlberta]
- Mathematical models in hydraulic fracturing design [John McLennan, uUtah]

Discussion

Coffee Break, 09:40 – 10:00

Session 7: Groundwater and Soil Gas Sampling (Chair, Frank Schwartz, Editor, Groundwater) 10:00 – Noon

- Groundwater quality assessment, Marcellus shale region [Don Siegel, uSyracuse & Bert Smith, Chesapeake]
- The Pavillion, Wyoming dispute [API Team]
- Thermogenic gas emission on faults in central New York State [John Fountain, NC State]
- The fracture and fault systems and associated gas seepage, Rocky Mtn foothills, WCSB [Steve Grasby, GSC Calgary]
- Discussion

Lunch, Noon – 13:00

Session 8: Knowledge Gaps and Research Needs (Chair, John Cherry) 13:00 – 15:00

- US Research Program into Subsurface Environmental Effects [Dan Soeder, DOE NETL]
- The Critical Need for Field-Based Hydrogeological Research [Jackson, Gorody, Mayer, Roy, Ryan and Van Stempvoort]
- Geomechanical Research Needs for Improved, Long-Term Well Integrity [Maurice Dusseault & Rob Gracie, uWaterloo]
- Research Programs in CO₂ Geological Sequestration : What They Teach Us [Rick Chalaturnyk, uAlberta]
- Concepts for funding mechanisms for industry-academic research [Steve Moran, AGS retired]
- Discussion

Coffee Break, 15:00 – 15:20

Final Session: General Discussion and Wrap Up (John Cherry, University Consortium) 15:20 – 17:00

Cash Bar, 17:00 – 18:00